MUNICIPAL SOLID WASTE IN THE UNITED STATES: *2005 FACTS AND FIGURES*

EXECUTIVE SUMMARY

U.S. Environmental Protection Agency
Municipal and Industrial Solid Waste Division
Office of Solid Waste

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OVERVIEW

This report describes the national municipal solid waste (MSW) stream based on data collected for 1960 through 2005. The historical perspective is useful for establishing trends in types of MSW generated and in the ways it is managed. In this Executive Summary, we briefly describe the methodology used to characterize MSW in the United States and provide the latest facts and figures on MSW generation, recycling, and disposal.

In the United States, we generated approximately 245.7 million tons of MSW in 2005—a decrease of 1.6 million tons from 2004. Excluding composting, the amount of MSW recycled increased to 58.4 million tons, an increase of 1.2 million tons from 2004. This is a 2 percent increase in the tons recycled. The tons recovered for composting rose slightly to 20.6 million tons in 2005, up from 20.5 million tons in 2004. The recovery rate for recycling (including composting) was 32.1 percent in 2005, up from 31.4 percent in 2004.[1] (See Tables ES-1 and ES-2 and Figures ES-1 and ES-2.)

MSW generation in 2005 declined to 4.54 pounds per person per day. This is a decrease of 1.5 percent from 2004 to 2005. The recycling rate in 2005 was 1.46 pounds per person per day. Discards sent to a landfill after recycling declined to 2.46 pounds per person per day in 2005 (Table ES-3).

[1] Data shown for 2000 through 2004 have been adjusted to reflect the latest revisions and, therefore, may differ from the same measure reported previously.

Table ES-1
GENERATION, MATERIALS RECOVERY, COMPOSTING,
COMBUSTION WITH ENERGY RECOVERY, AND DISCARDS OF MUNICIPAL SOLID WASTE,
1960 - 2005
(in millions of tons)

Activity	1960	1970	1980	1990	2000	2003	2004	2005
Generation	88.1	121.1	151.6	205.2	237.6	240.4	247.3	245.7
Recovery for recycling	5.6	8.0	14.5	29.0	52.7	55.8	57.2	58.4
Recovery for composting*	Neg.	Neg.	Neg.	4.2	16.5	19.1	20.5	20.6
Total materials recovery	5.6	8.0	14.5	33.2	69.1	74.9	77.7	79.0
Combustion with energy recovery†	0.0	0.4	2.7	29.7	33.7	33.7	34.1	33.4
Discards to landfill, other disposal‡	82.5	112.7	134.4	142.3	134.8	131.9	135.5	133.3

* Composting of yard trimmings, food scraps and other MSW organic material.
Does not include backyard composting.

† Includes combustion of MSW in mass burn or refuse-derived fuel form, and combustion with energy recovery of source separated materials in MSW (e.g., wood pallets and tire-derived fuel).

‡ Discards after recovery minus combustion with energy recovery. Discards include combustion without energy recovery.
Details may not add to totals due to rounding.

Table ES-2
GENERATION, MATERIALS RECOVERY, COMPOSTING,
COMBUSTION WITH ENERGY RECOVERY, AND DISCARDS OF MUNICIPAL SOLID WASTE,
1960 - 2005
(in percent of total generation)

Activity	1960	1970	1980	1990	2000	2003	2004	2005
Generation	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Recovery for recycling	6.4%	6.6%	9.6%	14.2%	22.2%	23.2%	23.1%	23.8%
Recovery for composting*	Neg.	Neg.	Neg.	2.0%	6.9%	7.9%	8.3%	8.4%
Total materials recovery	6.4%	6.6%	9.6%	16.2%	29.1%	31.1%	31.4%	32.1%
Combustion with energy recovery†	0.0%	0.3%	1.8%	14.5%	14.2%	14.0%	13.8%	13.6%
Discards to landfill, other disposal‡	93.6%	93.1%	88.6%	69.3%	56.7%	54.9%	54.8%	54.3%

* Composting of yard trimmings, food scraps and other MSW organic material.
Does not include backyard composting.

† Includes combustion of MSW in mass burn or refuse-derived fuel form, and combustion with energy recovery of source separated materials in MSW (e.g., wood pallets and tire-derived fuel).

‡ Discards after recovery minus combustion with energy recovery. Discards include combustion without energy recovery
Details may not add to totals due to rounding.

Table ES-3
GENERATION, MATERIALS RECOVERY, COMPOSTING
COMBUSTION WITH ENERGY RECOVERY, AND DISCARDS OF MUNICIPAL SOLID WASTE,
1960 - 2005
(in pounds per person per day)

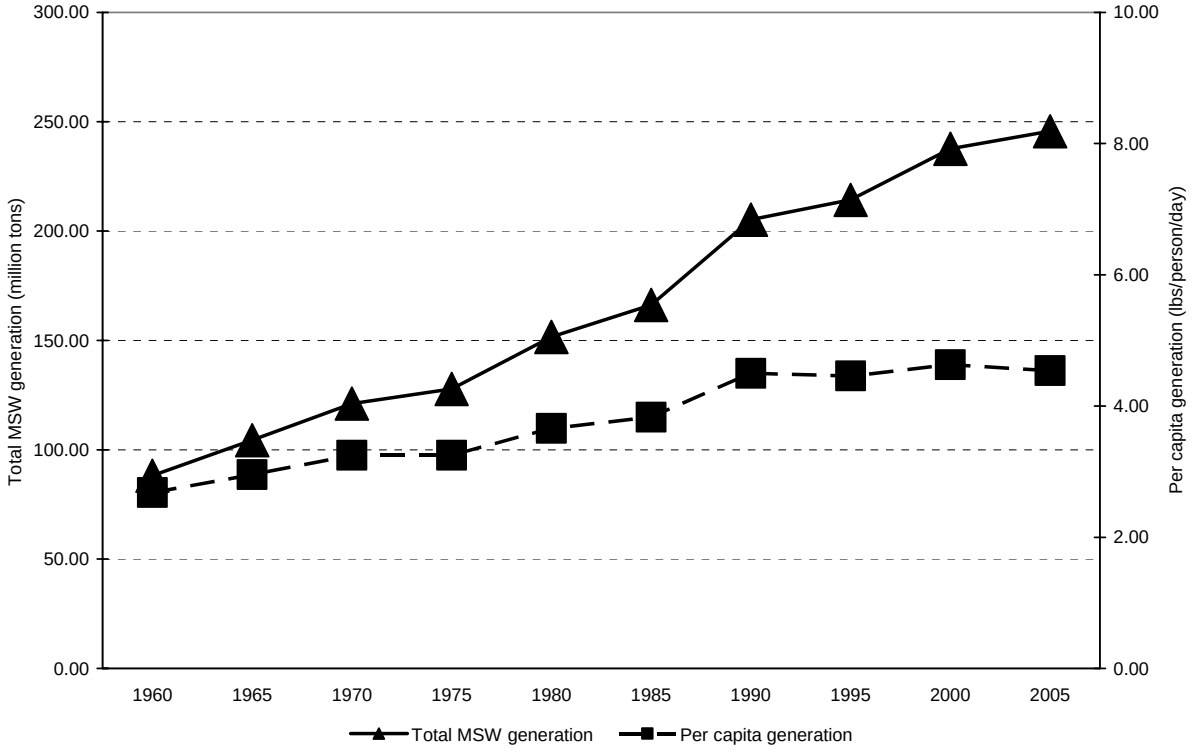
Activity	1960	1970	1980	1990	2000	2003	2004	2005
Generation	2.68	3.25	3.66	4.50	4.63	4.53	4.61	4.54
Recovery for recycling	0.17	0.22	0.35	0.64	1.03	1.05	1.07	1.08
Recovery for composting*	Neg.	Neg.	Neg.	0.09	0.32	0.36	0.38	0.38
Total materials recovery	0.17	0.22	0.35	0.73	1.35	1.41	1.45	1.46
Combustion with energy recovery†	0.00	0.01	0.07	0.65	0.66	0.63	0.64	0.62
Discards to landfill, other disposal‡	2.51	3.02	3.24	3.12	2.62	2.49	2.52	2.46
Population (millions)	179.979	203.984	227.255	249.907	281.422	290.850	293.660	296.410

* Composting of yard trimmings, food scraps and other MSW organic material.
Does not include backyard composting.

† Includes combustion of MSW in mass burn or refuse-derived fuel form, and combustion with energy recovery of source separated materials in MSW (e.g., wood pallets and tire-derived fuel).

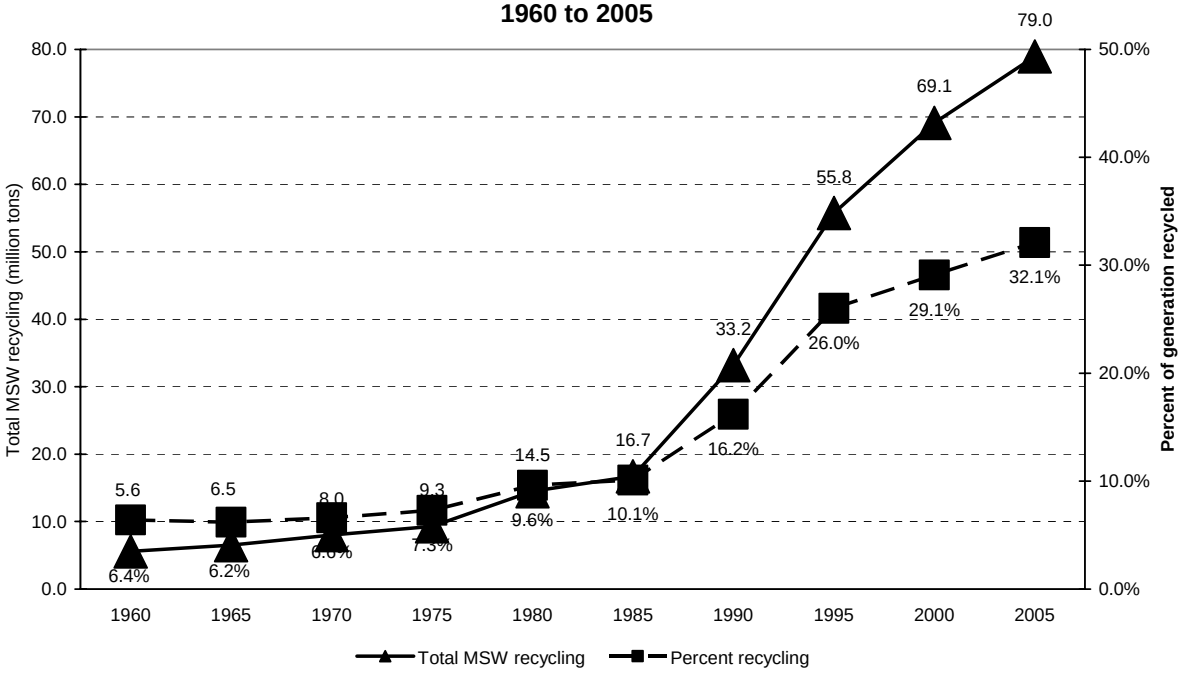
‡ Discards after recovery minus combustion with energy recovery. Discards include combustion without energy recovery.
Details may not add to totals due to rounding.

Figure ES-1: MSW Generation Rates, 1960 to 2005



The state of the economy has a strong impact on consumption and waste generation. Waste generation continued to increase through the 1990s as economic growth continued to be strong. Between 2000 and 2005, total growth in waste generation slowed. On a per capita basis, 2005 waste generation at 4.54 pounds per person per day is only slightly higher than the 1990 rate of 4.50 pounds per person per day.

Figure ES-2: MSW Recycling Rates, 1960 to 2005



WHAT IS INCLUDED IN MUNICIPAL SOLID WASTE?

MSW—otherwise known as trash or garbage—consists of everyday items such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, and batteries. Not included are materials that also may be disposed in landfills but are not generally considered MSW, such as construction and demolition debris, municipal wastewater treatment sludges, and non-hazardous industrial wastes.

MUNICIPAL SOLID WASTE IN PERSPECTIVE

Trends Over Time

Over the last few decades, the generation, recycling, and disposal of MSW have changed substantially (see Tables ES-1, ES-2, and ES-3 and Figures ES-1 and ES-2). MSW generation has continued to increase from 1960, when it was 88 million tons. The generation rate in 1960 was just 2.7 pounds per person per day; it grew to 3.7 pounds per person per day in 1980; reached 4.5 pounds per person per day in 1990; increased to 4.6 pounds per person per day in 2000; and returned to about 4.5 pounds per person per day in 2005.

Over time, recycling rates have increased from 10 percent of MSW generated in 1980 to 16 percent in 1990, to 29 percent in 2000, and to 32 percent in 2005. Disposal of waste to a landfill has decreased from 89 percent of the amount generated in 1980 to 54 percent of MSW in 2005.

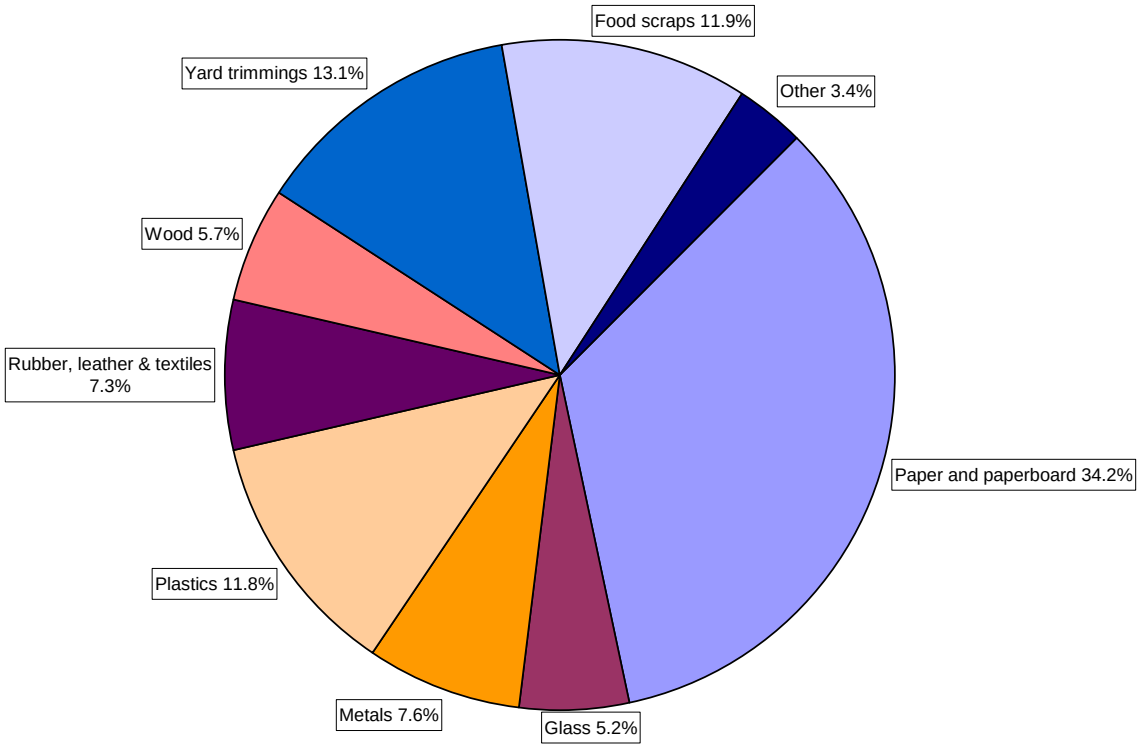
MUNICIPAL SOLID WASTE IN 2005

The U.S. Environmental Protection Agency (EPA) uses two methods to analyze the 245.7 million tons of MSW generated in 2005. The first is by **material** (paper and paperboard, yard trimmings, food scraps, plastics, metals, glass, wood, rubber, leather and textiles, and other); the second is by several major **product** categories. The product-based categories are containers and packaging; nondurable goods (e.g., newspapers); durable goods (e.g., appliances); food scraps; and other materials.

Materials in MSW

A breakdown, by weight, of the MSW **materials** generated in 2005 is provided in Figure ES-3. Paper and paperboard made up the largest component of MSW generated (34 percent), and yard trimmings were the second-largest component (13 percent). Glass, metals, plastics, wood, and food scraps each constituted between 5 and 12 percent of the total MSW generated. Rubber, leather, and textiles combined made up about 7 percent of MSW, while other miscellaneous wastes made up approximately 3 percent of the MSW generated in 2005.

Figure ES-3: 2005 Total MSW Generation - 246 Million Tons (Before Recycling)



A portion of each material category in MSW was recycled or composted in 2005. The highest rates of recovery were achieved with yard trimmings, paper and paperboard products, and metal products. About 62 percent (19.9 million tons) of yard trimmings was recovered for composting in 2005. This represents nearly a five-fold increase since 1990. Fifty percent (42.0 million tons) of paper and paperboard was recovered for recycling in 2005. Recycling these organic materials alone diverted more than 25 percent of municipal solid waste from landfills

and combustion facilities. In addition, about 6.9 million tons, or about 37 percent, of metals were recovered for recycling. Recycling rates for all materials categories in 2005 are listed in Table ES-4.

Table ES-4
GENERATION AND RECOVERY OF MATERIALS IN MSW, 2005
(in millons of tons and percent of generation of each material)

Material	Weight Generated	Weight Recovered	Recovery As a Percent of Generation
Paper and paperboard	84.0	42.0	50.0%
Glass	12.8	2.76	21.6%
Metals			
Steel	13.8	4.93	35.8%
Aluminum	3.21	0.69	21.5%
Other nonferrous metals*	1.74	1.26	72.4%
Total metals	18.7	6.88	36.8%
Plastics	28.9	1.65	5.7%
Rubber and leather	6.70	0.96	14.3%
Textiles	11.1	1.70	15.3%
Wood	13.9	1.31	9.4%
Other materials	4.57	1.17	25.6%
Total Materials in Products	180.7	58.4	32.3%
Other wastes			
Food, other**	29.2	0.69	2.4%
Yard trimmings	32.1	19.9	61.9%
Miscellaneous inorganic wastes	3.69	Neg.	Neg.
Total Other Wastes	65.0	20.6	31.6%
TOTAL MUNICIPAL SOLID WASTE	245.7	79.0	32.1%

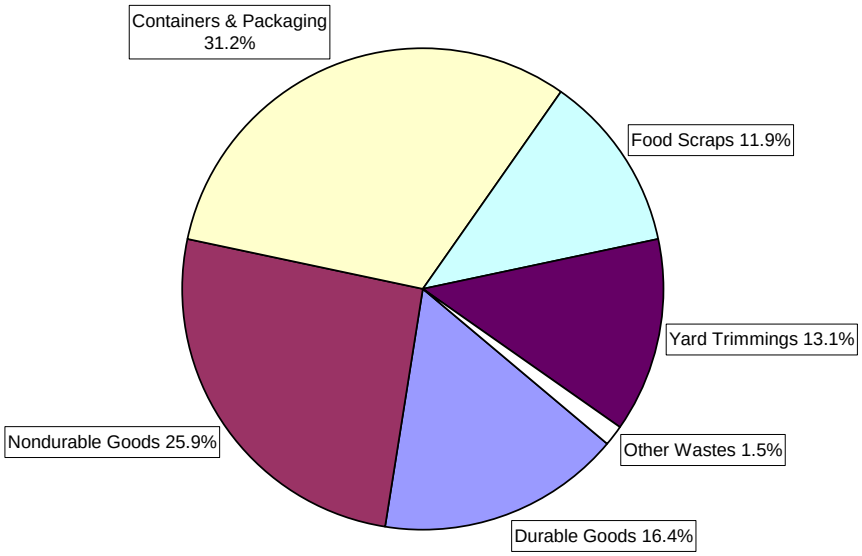
Includes waste from residential, commercial, and institutional sources.
* Includes lead from lead-acid batteries.
** Includes recovery of other MSW organics for composting.
Details may not add to totals due to rounding.
Neg. = Less than 5,000 tons or 0.05 percent.

Products in MSW

The breakdown, by weight, of **product categories** generated in 2005 is shown in Figure ES-4. Containers and packaging comprised the largest portion of products generated, at 31 percent (76.7 million tons) of total MSW generation. Nondurable goods were the second-largest

fraction, at 26 percent (63.7 million tons). The third-largest category of products is durable goods, which made up 16 percent (40.3 million tons) of total MSW generation.

Figure ES-4: Products Generated in MSW, 2005
(Total Weight = 246 million tons)



The generation and recovery of the product categories in MSW in 2005 are shown in Table ES-5. This table shows that recovery of containers and packaging was the highest of the three product categories—39.8 percent of containers and packaging generated in 2005 were recovered for recycling. About 45 percent of all aluminum cans was recovered (36.3 percent of all aluminum packaging, including foil), while 63.3 percent of steel packaging (mostly cans) was recovered. Paper and paperboard containers and packaging were recovered at a rate of 58.8 percent; corrugated containers accounted for most of that amount.

Approximately 25 percent of glass containers was recovered, while about 15 percent of wood packaging (mostly wood pallets removed from service) was recovered for recycling. More than 9 percent of plastic containers and packaging were recovered—mostly soft drink, milk, and water bottles.

Table ES-5
GENERATION AND RECOVERY OF PRODUCTS IN MSW
BY MATERIAL, 2005
(in millons of tons and percent of generation of each product)

Products	Weight Generated	Weight Recovered	Recovery as a Percent of Generation
Durable Goods			
Steel	11.4	3.43	30.1%
Aluminum	1.08	Neg.	Neg.
Other non-ferrous metals*	1.74	1.26	72.4%
Total metals	14.2	4.69	33.0%
Glass	1.83	Neg.	Neg.
Plastics	8.71	0.37	4.2%
Rubber and leather	5.68	0.96	16.9%
Wood	5.37	Neg.	Neg.
Textiles	3.02	0.28	9.3%
Other materials	1.45	1.17	80.7%
Total durable goods	40.3	7.47	18.5%
Nondurable Goods			
Paper and paperboard	44.9	19.0	42.4%
Plastics	6.55	Neg.	Neg.
Rubber and leather	0.99	Neg.	Neg.
Textiles	7.91	1.42	18.0%
Other materials	3.36	Neg.	Neg.
Total nondurable goods	63.7	20.5	32.1%
Containers and Packaging			
Steel	2.37	1.50	63.3%
Aluminum	1.90	0.69	36.3%
Total metals	4.27	2.19	51.3%
Glass	10.9	2.76	25.3%
Paper and paperboard	39.0	22.9	58.8%
Plastics	13.7	1.28	9.4%
Wood	8.56	1.31	15.3%
Other materials	0.24	Neg.	Neg.
Total containers and packaging	76.7	30.5	39.8%
Other Wastes			
Food, other**	29.2	0.69	2.4%
Yard trimmings	32.1	19.9	61.9%
Miscellaneous inorganic wastes	3.69	Neg.	Neg.
Total other wastes	65.0	20.6	31.6%
TOTAL MUNICIPAL SOLID WASTE	245.7	79.0	32.1%

Includes waste from residential, commercial, and institutional sources.
* Includes lead from lead-acid batteries.
** Includes recovery of other MSW organics for composting.
Details may not add to totals due to rounding.
Neg. = Less than 5,000 tons or 0.05 percent.

Overall recovery of *nondurable goods* was at 32.1 percent in 2005. Most of this recovery comes from paper products such as newspapers and high-grade office papers (e.g., white papers). Newspapers constituted the largest portion of this recovery, with 88.9 percent of newspapers generated being recovered for recycling. An estimated 62.6 percent of high-grade office papers and 38.5 percent of magazines was recovered in 2005. Newspaper, high-grade office paper, and magazine recovery increased in percentage between 2004 and 2005.

Recovery percentage of "Other Commercial Printing" stayed about the same at 10.4 percent. The other paper products in the nondurable goods category increased slightly between 2004 and 2005, with Standard (A) mail* recovered at an estimated 35.8 percent, and directories at an estimated 18.2 percent.

The nondurable goods category also includes clothing and other textile products—18 percent of these products were recovered for recycling or export in 2005.

Overall, *durable goods* were recovered at a rate of 18.5 percent in 2005. Nonferrous metals other than aluminum had one of the highest recovery rates, at 72.4 percent, due to the high rate of lead recovery from lead-acid batteries. Recovery of steel in all durable goods was 30.1 percent, with high rates of recovery from appliances and other miscellaneous durable goods.

One of the products with a very high recovery rate was lead-acid batteries, recovered at a rate of 98.8 percent in 2005. Other products with particularly high recovery rates were newspapers (88.9 percent), corrugated boxes (71.5 percent), major appliances (67.0 percent), steel packaging (63.3 percent), and aluminum cans (44.8 percent). About 35 percent of rubber tires were recovered for recycling. (Other tires were retreaded, and shredded rubber tires were made into tire-derived fuel.)

* Standard (A) mail was formerly called Third Class mail by the U.S. Postal Service.

RESIDENTIAL AND COMERCIAL SOURCES OF MSW

Sources of MSW, as characterized in this report, include both residential and commercial locations. We estimated residential waste (including waste from multi-family dwellings) to be 55 to 65 percent of total MSW generation. Commercial waste (including waste from schools, some industrial sites where packaging is generated, and businesses) constitutes between 35 and 45 percent of MSW. Local and regional factors, such as climate and level of commercial activity, contribute to these variations.

MANAGEMENT OF MSW

Overview

EPA's integrated waste management hierarchy includes the following four components, listed in order of preference:

- Source reduction (or waste prevention), including reuse of products and on-site (or backyard) composting of yard trimmings
- Recycling, including off-site (or community) composting
- Combustion with energy recovery
- Disposal through landfilling or combustion without energy recovery.

Although we encourage the use of strategies that emphasize the top of the hierarchy whenever possible, all four components remain important within an integrated waste management system.

Source Reduction

When we first established our waste management hierarchy, we emphasized the importance of *reducing* the amount of waste created, reusing whenever possible, and then recycling whatever is left. When municipal solid waste is reduced and reused, this is called "source reduction"—meaning the material never enters the waste stream.

Source reduction, also called waste prevention, includes the design, manufacture, purchase, or use of materials, such as products and packaging, to reduce their amount or toxicity before they enter the MSW management system. Examples of source reduction activities are:

- Designing products or packaging to reduce the quantity or the toxicity of the materials used or make them easy to reuse.
- Reusing existing products or packaging, such as refillable bottles, reusable pallets, and reconditioned barrels and drums.
- Lengthening the lives of products such as tires so fewer need to be produced and therefore fewer need to be disposed of.
- Using packaging that reduces the amount of damage or spoilage to the product.
- Managing nonproduct organic wastes (e.g., food scraps, yard trimmings) through onsite composting or other alternatives to disposal (e.g., leaving grass clippings on the lawn).

As the nation has begun to realize the value of its resources, both financial and material, efforts to reduce waste generation have increased.

Recycling

- Recycling (including community composting) recovered 32.1 percent (79 million tons) of MSW in 2005.
- There were about 8,550 curbside recycling programs in the United States in 2005.
- About 3,470 yard trimmings composting programs were reported in 2005.

Combustion with Energy Recovery

An estimated 33.4 million tons (13.6 percent) of MSW was combusted with energy recovery in 2005 (see Tables ES-1 and ES-2), slightly less than the 34.1 million tons estimated in 2004. Combustion with energy recovery increased from 2.7 million tons in 1980 to 29.7 million tons in 1990. Since 1990, the quantity of MSW combusted with energy recovery has increased slightly.

Disposal

During 2005, about 54.3 percent of MSW was landfilled, down somewhat from 54.8 percent in 2004. As shown in Figure ES-5, the number of MSW landfills decreased substantially over the past 18 years, from nearly 8,000 in 1988 to 1,654 in 2005—while average landfill size increased. At the national level, capacity does not appear to be a problem, although regional dislocations sometimes occur.

- The percentage of MSW landfilled decreased slightly from 2004 to 2005. Over the long term, the tonnage of MSW landfilled in 1990 was 142.3 million tons (see Table ES-1), but decreased to 134.8 million tons in 2000. The tonnage increased to 135.5 million tons in 2004, then declined to 133.3 in 2005. The tonnage landfilled results from an interaction among generation, recycling, and combustion with energy recovery, which do not necessarily rise and fall at the same time.

- The net per capita discard rate (after materials recovery and combustion with energy recovery) was 2.46 pounds per person per day, down from 3.12 pounds per person per day in 1990, down from the 2.62 pounds per person per day in 2000 (Table ES-3).

MSW recovered for recycling (including composting), combusted with energy recovery, and discarded in 2005 is shown in Figure ES-6. In 2005, 79.0 millions tons (32.1 percent) of MSW were recycled, 33.4 million tons (13.6 percent) were combusted with energy recovery, and 133.3 million tons (54.3 percent) were landfilled or otherwise disposed. (Relatively small amounts of this total undoubtedly were incinerated without energy recovery, littered, or illegally dumped rather than landfilled.)

Figure ES-5: Number of Landfills in the United States, 1988-2005

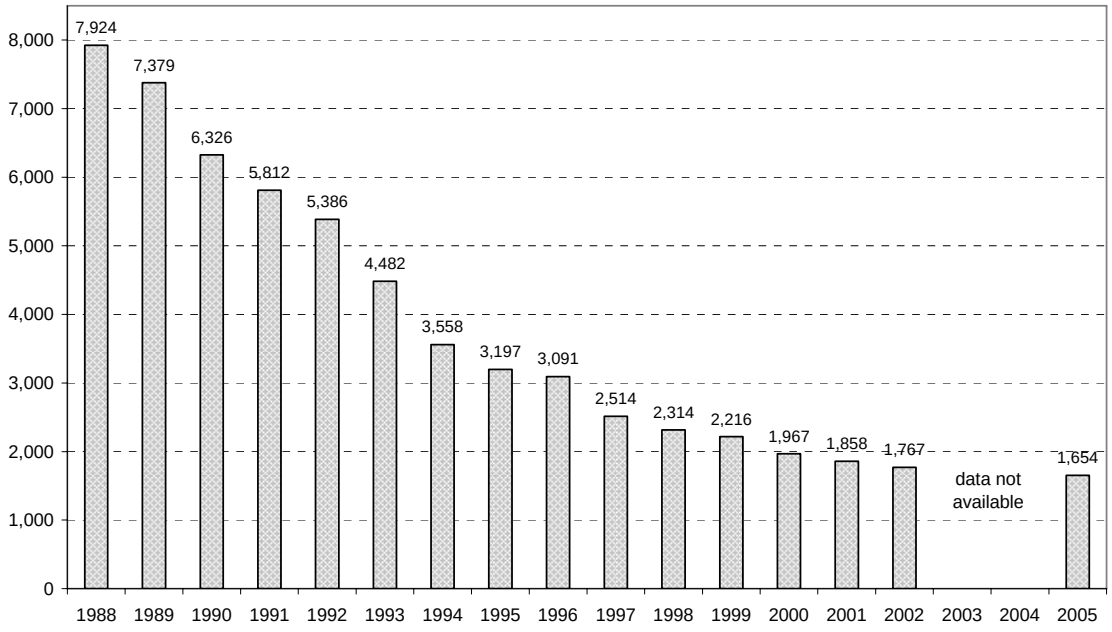
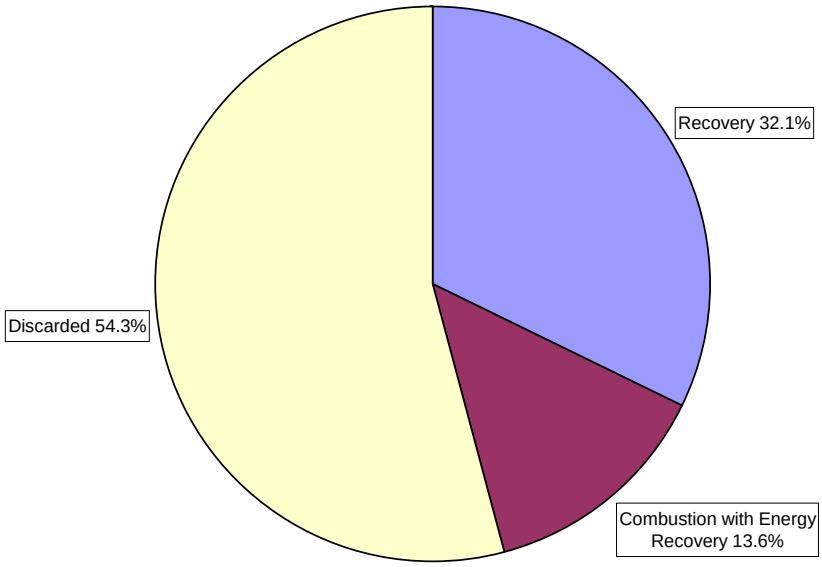


Figure ES-6: Management of MSW in the United States, 2005



FOR FURTHER INFORMATION

This report and related additional data are available on the Internet at <www.epa.gov/osw>.

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